

NOVEMBER 1961 — 42
VOLUME 87

NO. SA 6
PART 2

Your attention is invited

**NEWS
OF THE
SANITARY
ENGINEERING
DIVISION
OF
ASCE**



**JOURNAL OF THE SANITARY ENGINEERING DIVISION
PROCEEDINGS OF THE AMERICAN SOCIETY OF CIVIL ENGINEERS**

NEW
OF
SALTY
ENGINEERING

DIVISION

ASCE

1912



AMERICAN SOCIETY OF CIVIL ENGINEERS
NEW YORK

DIVISION ACTIVITIES

SANITARY ENGINEERING DIVISION

Proceedings of the American Society of Civil Engineers

NEWS

November, 1961

EDITORIAL

Time passes swiftly, and ideas, once new, rapidly become old. Stimulation, either constructive or destructive, is needed to fertilize endeavors that are but an adjunct to gainful employment.

With this issue of the Newsletter, the time has arrived when another will edit the material you receive each two months. In passing this on, I hope to do as I received—a strong, virile, helpful piece of work that the sanitary engineering profession can use.

Rodney R. Fleming, an experienced editor, will assume his duties with publication of the January 1962 Newsletter. I suspect, and hope, that he will keep what is good, discard what is bad, and add his own ideas.

You—the readers—can help him—us—yourselves by supplying news items, constructive criticism, and support. It is trite to say "It's up to you," but in many ways, it is.

Finally, I want to thank those who have helped me for the last two years—and, in particular, Walt Lyon, who has never failed to send news. In singing this swan song, I must remark that it's been work, but it's been fun. I've enjoyed every minute between issues, and even sometimes when rushing to meet a deadline. I hope that you, too, have enjoyed the Newsletter.

John R. Thoman

RESEARCH FACILITIES GRANTS ANNOUNCED

Dr. Luther L. Terry, Surgeon General of the Public Health Service, recently announced the award of 48 grants, totaling \$14,575,628, to help build and equip additional health research facilities in 40 institutions in 23 States.

Administered by the Division of Research Grants of the National Institutes of Health, the Health Research Facilities construction program is designed to expand and improve the Nation's facilities for medical research. Grants are made to both public and private nonprofit hospitals, medical and dental

Note.—No. 1961-42 is Part 2 of the copyrighted Journal of the Sanitary Engineering Division, Proceedings of the American Society of Civil Engineers, Vol. 87, No. SA 6, November, 1961.

Copyright 1961 by the American Society of Civil Engineers.

schools, schools of public health and other research institutions and are awarded on a matching basis.

Including the grants announced today, 832 awards totaling \$164,423,772 have been made to eligible institutions since the inception of the Health Research Facilities program.

Grants of interest to the sanitary engineering profession were made as follows:

<u>INSTITUTION</u>	<u>FACILITY</u>	<u>AMOUNT</u>
Kansas State University of Agriculture & Applied Sciences Manhattan, Kansas	Environmental Research Addition & Equipment	\$ 80,000
Johns Hopkins University Baltimore, Maryland	Radiological Science Re- search Building	500,000
University of Rhode Island Kingston, Rhode Island	Sanitary Engineering Research Facilities	74,828

TERRY APPOINTS NEW STUDY GROUP

Dr. Luther L. Terry, Surgeon General of the Public Health Service, Department of Health, Education, and Welfare, announced today appointment of a special committee on nationally-known scientists to develop long-range objectives for the environmental health programs of the Public Health Service.

Dr. Paul M. Gross, of the Department of Chemistry, Duke University, and president-elect of the American Association for the Advancement of Science, will be chairman of the 16-member group.

The Committee's job of developing environmental health objectives will include examination of the Service's existing research and operating programs of surveillance and control and give special consideration to (1) the manpower requirements for such activities; (2) the roles of intramural and extramural research efforts; and (3) the relationships of current and proposed PHS programs to other Federal programs and facilities.

The Public Health Service now has environmental health programs in water pollution and water supply, air pollution, radiological health, occupational health, and environmental engineering and food protection.

"These problems and their relationship to health are among the most important facing us, and since they are bound to increase in seriousness it is urgent that we do all we can to set our long-range goals skillfully," Dr. Terry said.

The Committee has been asked to report its findings to the Surgeon General about November 1.

Other committee members are:

Dr. Clark D. Ahlberg, Syracuse University, Syracuse, N. Y.;

Dr. Gaylord Anderson, School of Public Health, University of Minnesota, Minneapolis, Minn.;

Dr. Leslie A. Chambers, Scientific Director, Allen Hancock Foundation for Scientific Research, University of Southern Calif., Los Angeles, Calif.;

Dr. Charles A. Dambach, Director of Natural Resources Institute, Ohio State University, Columbus, O.;

Dr. Kenneth P. DuBois, Department of Pharmacology, University of Chicago, Chicago, Ill.;

Dr. Samuel A. Goldblith, Department of Food Technology, Massachusetts Institute of Technology, Cambridge, Mass.;

Mr. Seth Gordon, Vice President, North American Wildlife Foundation, Sacramento 18, Calif.;

Dr. Philip Handler, Department of Biochemistry & Nutrition, Duke University School of Medicine, Durham, N. C.;

Dr. Theodore F. Hatch, Professor of Industrial Health Engineering, University of Pittsburgh, Pittsburgh, Pa.;

Dr. John Logan, Chairman, Department of Civil Engineering, Northwestern University, Evanston, Ill.;

Dr. Malcolm Merrill, Director of Public Health, State Department of Public Health, Berkeley, Calif.;

Mr. Dwight Metzler, State Board of Health, Topeka, Kansas;

Dr. Russell Morgan, Professor of Radiology, Johns Hopkins University Medical School, Baltimore, Md.;

Dr. E. M. Mrak, Head, Department of Food Technology, University of California, Davis, Calif.;

Dr. Leslie Silverman, School of Public Health, Harvard University, Cambridge, Mass.

WATER SUPPLY & POLLUTION CONTROL

NEW YORK CITY POLLUTION CONTROL

Just how costly and complex is New York City's vast sewerage and pollution control program is pictured in a recently-issued report on the subject.

Known as "Report 29," and the work of Sol Pincus, consulting engineer of Fishkill, N. Y., the study is part of Vol. II of "Background Research on the Top Structure of the Government of the City of New York." The entire report was made for the New York State Commission on Governmental Operations of the City of New York.

New York's natural advantages for sewerage and pollution control (tidal bays and estuaries) are "largely dissipated" Mr. Pincus declares, by "dispersed and conflicting administrative responsibilities and the lack of an overall integrated control of all aspects of the project."

New York City's pollution control program, which by 1960 had cost \$200 million, with an estimated \$300 million more yet to be spent, "has failed significantly to improve the sanitary quality of the bathing and shore recreational waters," the report states.

The practice of installing combined sewers for storm waters and sanitary sewage is a major contributing factor in continuing pollution of nearby waters, the report indicates. Other factors listed are: poor maintenance of the sewerage system, private sewers, private outfalls, the problem of industrial wastes, and overloading of interceptors and sewage treatment plants by unnecessary water flows.

Nine city agencies, two state agencies, and three federal agencies are involved in one way or another with the pollution control program of New York waters, the report emphasizes.

The report concludes that:

1. Planning, construction and maintenance of the City's sewerage system should be in the same City-wide department that plans, builds, and maintains the sewage treatment and pollution control plants.
2. There should be a separate City department to handle sewerage and pollution control operations.
3. A special board, or committee, with members representing industry, engineering and civic interests, should be set up under the Mayor and should report to him and the Public on pollution abatement progress and should keep abreast of activities of the various agencies involved in pollution abatement, in the New York City area.
4. To secure the most economical procedures in sewer construction and maintenance and sewage treatment, the City should make increased allowances for personnel to keep the city abreast of research and new developments in this field.

BIDS ASKED FOR CONSTRUCTION OF ROSWELL, NEW MEXICO, SALINE WATER CONVERSION DEMONSTRATION PLANT

Construction specifications for the one million gallons per day saline water conversion demonstration plant to be erected at Roswell, New Mexico, are now available and bids will be opened on December 5.

The specifications contained in the Notice to Bidders provide for a brackish water conversion plant utilizing a forced-circulation vapor-compression process together with an operations building and other appurtenant facilities. The work is to be performed under a single contractor responsible for complete construction and start-up operation of the conversion plant.

Architect-engineering services for the plant were performed by the Catalytic Construction Company in cooperation with the Office of Saline Water. The Department expects to award a contract in December. Construction is scheduled to be completed within 12 months from the date of award of contract.

The selection of the vapor-compression saline water conversion process was based on a study made by Dodge and Ashaya in 1959 which was published in the Office of Saline Water Research and Development Progress Report No. 21, "Economic Evaluation Study of Distillation of Saline Water by means of Forced-Circulation Vapor-Compression Distillation Equipment." (This report is available from the Office of Technical Services, United States Department of Commerce. To obtain a copy specify Order No. PB 161395. The price is \$3.00.) This economic study established some of the parameters for the design of the plant. Tests to establish scale prevention techniques for the Roswell water were performed at the Wrightsville Beach Test Facility by the W. L. Badger Associates, Inc., and at Freeport by the Dow Chemical Company. Based on the data obtained, a performance specification was prepared for the demonstration plant.

The fresh water produced by the plant will be sold to the City of Roswell, New Mexico. Under the terms of a cooperative agreement, the City will also provide the site for the plant, deliver the brackish water to the plant, and dispose of the brine effluent.

This is the fourth of five saline water conversion demonstration plants authorized by Public Law 85-883. The specifications for the fifth plant, a 250,000 gallon per day sea water conversion plant to be erected at Wrights-

ville Beach, North Carolina, will be issued early in 1962. The Lummus Company of Newark, New Jersey, has been awarded a contract to prepare these specifications, the Department of the Interior announced today.

PENNSYLVANIA HEALTH REPORT

Pennsylvania has a "successful" water pollution control program, a just-released survey of health conditions in Pennsylvania reports.

The report is the work of a group of health specialists from Johns Hopkins University, assisted by a citizens' committee headed by General Matthew B. Ridgway.

The survey explores all parts of Pennsylvania's health picture and makes specific recommendations for what the survey team feels to be needed programs and services.

The report notes that 75% of needed industrial wastes treatment plants have been installed and that wastes from 85% of seweried municipalities receive adequate treatment before being discharged to streams.

In an effort to prevent haphazard water and sewage conditions in real estate developments, the team recommended that legislation is needed to require that plans be filed and approved before lots are sold or buildings erected which will show the method of furnishing adequate and satisfactory water supply and sewerage.

WATER CONSUMPTION TRENDS IN MASSACHUSETTS

Much has been written lately in the popular press as well as various technical publications on the theme that "we are exhausting our water resources" or "serious and widespread water shortages are anticipated in the . . . near future." Without passing on the merits of any of these articles there is little doubt that at least here in Massachusetts the general trend has been toward a steady increase in water consumption.

The table of representative Massachusetts cities and towns given below indicates that in almost all cases the use of water has increased at a faster rate than has the general population. In some communities the rise in water consumption has been almost unbelievable.

In certain cases there is a special reason for the increase such as the establishment of a new industry which uses a large amount of water; however, in most cases the increase is due to a number of related factors. In a few of the communities listed, the water consumption is shown to have actually decreased. This may be due to the closing of a large water consuming industry, a general decrease in population or even the beginning of a program of metering the water supply.

City or Town	Year	Population	Average Daily Water Consumption	Per Capita Daily Water Consumption	Per Cent Increase In Population	Per Cent Increase In Average Daily Water Consumption	Per Cent Increase In Per Capita Water Consumption
Amesbury	1909	9,683	402,000	42			
	1957	11,189	802,000	72	15.6	99.5	71.5
Amherst	1922	5,719	740,000	129			
	1958	8,204	1,301,000	158	43.0	76.0	22.5
Andover	1890	6,142	135,000	22			
	1958	14,535	1,889,000	130	136.5	1,300.0	490.0
Ayer	1889	2,156	55,000	25			
	1958	3,479	842,000	242	61.7	1,430.0	867.0
Beverly	1888	10,167	833,000	82			
	1958	31,432	3,184,000	109	208.0	282.0	32.9
Billerica	1900	2,775	52,000	19			
	1958	14,403	788,000	55	424.0	1,415.0	189.0
Burlington	1952	3,250	106,000	33			
	1957	5,225	521,000	100	60.9	392.0	203.0
Cambridge	1875	47,838	2,761,000	58			
	1958	98,958	18,492,000	187	107.0	570.0	222.0
Chicopee	1920	32,214	2,455,000	68			
	1958	49,071	6,985,000	142	35.2	185.0	109.0
Danvers- Middleton	1877	7,308	333,000	46			
	1958	21,555	1,782,000	98	195.0	435.0	113.0
Everett	1904	28,156	2,624,000	93			
	1954	45,200	8,291,000	183	61.0	216.0	96.8
Fall River	1875	45,340	811,000	18			
	1958	105,195	9,524,000	91	132.0	1,075.0	405.0
Fitchburg	1914	39,290	3,812,000	97			
	1957	42,925	8,679,000	202	9.3	128.0	108.0
Hingham	1931	8,953	1,539,000	173			
	1958	19,242	2,287,000	119	115.0	48.6	-31.2
Lowell	1875	49,688	1,222,000	25			
	1958	93,876	7,990,000	85	90.0	554.0	240.0
Medfield	1923	3,759	79,000	21			
	1958	5,293	240,000	45	41.0	204.0	114.0
Merrimac	1905	1,884	52,000	28			
	1958	2,980	383,000	129	58.0	636.0	361.0
Millis	1914	1,433	47,000	33			
	1956	3,030	326,000	108	111.0	509.0	227.0
New Bedford	1875	25,895	1,137,000	44			
	1957	105,448	19,226,000	183	307.0	1,600.0	316.0
Peabody	1882	9,230	572,000	62			
	1956	26,682	3,266,000	122	189.0	470.0	97.0
Rockport	1895	5,289	85,000	16			
	1958	4,633	472,000	102	-12.5	455.0	537.0
Rowley	1952	1,768	32,000	18			
	1955	2,007	73,600	37	13.5	130.0	106.0
Southbridge	1910	12,592	1,626,000	129			
	1958	17,271	1,277,000	74	37.0	-21.5	-42.6
Tewksbury	1954	7,505	282,000	37			
	1958	10,848	737,000	68	44.5	162.0	84.0
Topsfield	1951	1,412	59,000	40			
	1958	2,208	78,000	35	56.4	32.2	-12.5
Waltham	1875	9,967	495,000	50			
	1956	50,115	5,510,000	109	400.0	1,010.0	118.9
Wayland	1929	2,801	168,000	60			
	1958	7,359	766,000	105	163.0	355.0	75.0
Wenham	1949	1,594	53,000	33			
	1957	2,245	175,000	78	40.7	230.0	136.0
Westfield	1911	16,517	1,900,000	115			
	1958	22,046	2,039,000	92	33.5	7.3	-20.0

MANUFACTURING CHEMISTS ASSOCIATION'S REPORT ON TASTE AND ODOR

The Manufacturing Chemists Association has recently released a report by the Franklin Institute of Philadelphia on the first phase of its study of taste and odor in water. Phase I of this study which was initiated in 1960 consists of a selected accumulation of known information and experience on this subject. Phase 2 of the program now under way is directed toward developing an analytical technique for measuring odor, determining resultant effects or combination or interaction of odor-causing substances, determining the influence of variable human factors on odor measurement, establishing a scale of odor intensity and developing a meaningful scheme of characterizing or describing odors.

Further information concerning the availability of this report can be obtained from the Manufacturing Chemists Association, Inc., 1825 Connecticut Ave. N. W., Washington 9, D. C.

FOURTH ILLINOIS SANITARY ENGINEERING CONFERENCE

Water Distribution Systems is the title of the Fourth Sanitary Engineering Conference to be held in Urbana, Illinois on February 13 and 14, 1962. The conference is sponsored jointly by the Division of Sanitary Engineering, Illinois Department of Public Health and the Department of Civil Engineering, University of Illinois. This conference is designed to be of value to operating and administrative personnel, contractors, and consulting engineers concerned with water supply. Further information may be obtained from Ben B. Ewing, Professor of Sanitary Engineering, University of Illinois, Urbana, or from C. W. Klassen, Chief Sanitary Engineer, Department of Public Health, Springfield, Illinois.

FEDERAL PEST CONTROL REVIEW BOARD ORGANIZED

President John F. Kennedy has announced that the Secretaries of Agriculture, Defense, Interior, and Health, Education, and Welfare have established a Federal Pest Control Review Board to coordinate efforts of Federal agencies engaged in pesticide control programs in minimizing harmful effects on public health and wildlife, the National Wildlife Federation reports.

The new Board will review pest control programs and advise agencies concerned of problems relating to the use of pesticides and other chemicals, especially involving interdepartmental interests and responsibilities. The procedure is designed to ensure that objectives of programs are sound, effective, economical and safe. The Board particularly will consider problems arising from pesticide uses involving hazards to human health, livestock and agricultural crops, and fish or wildlife.

Advances in technology have led to increased use of chemicals in many aspects of present-day living. Chemicals now are employed to control or eradicate a variety of pests found to be objectionable, destructive and hazardous. At the same time, however, chemicals sometimes have been used indiscriminately with needless losses to fish and wildlife and with possible dangers to the public health.

The Board shall be advisory to heads of Federal agencies represented. Actions of the Board shall not be construed as subjecting any agency, official, or function to control by the Board. The four Federal departments each have designated two members to serve on the Board. Dr. Robert J. Anderson of the Public Health Service has been elected Chariman.

NATIONAL FISH KILL SCORE

The Division of Water Supply and Pollution Control of the U.S. Public Health Service recently issued a report "Pollution-Caused Fish Kills in 1960." First of a series of annual reports on the effect of pollution on the nation's waters, this report covers the initial period, June 1, 1960 through December 31, 1960. The report is a cooperative federal-state program in which the state conservation and fish and game agencies have been asked to report instances of fish kills that are attributable to pollutants entering streams and lakes.

A total of 286 reports from 36 states were received from June through December 1960. The greatest number of fish kills was caused by industrial wastes followed closely by agricultural poisons. Domestic sewage and wastes from mining operations were other major causes.

Agricultural poisons and industrial wastes were the more lethal, destroying more fish and aquatic organisms than the other pollutants. It was estimated that more than 6,300,000 fish were killed. However, one pollution incident, involving industrial wastes, reportedly killed approximately 5 million fish.

Of the agricultural poisons, rotenone, DDT, 2-4-D and endrin were the specific causative agents most frequently reported. Cyanide and metallic ions were the principal causative agents of industrial wastes.

Fresh-water bodies, particularly rivers, were the scene of most fish kills. Most kills occurred during June, July and August (70 percent), with September and October accounting for 17 percent. The reporting program did not begin until June 1, 1960; therefore these figures are not truly representative of the entire year. However, during the summer and fall months stream temperatures are higher and flows are lower.

STATUS OF NEW YORK CLASSIFICATION PROGRAM

The New York Water Pollution Control Board has under way classification programs in various stages in 56 drainage basins covering practically the entire 49,500 square mile area of the Empire State. Classifications have been adopted by the Board for 33 drainage basins, with a total area of over 27,000 square miles, and for sections of the main stem of one of the major rivers. In 30 of the classified basins, pollution abatement programs are being conducted for the installation of sewage and industrial waste treatment facilities required for compliance with the adopted classifications.

Classification reports have been completed for 8 basins having a total area of about 7,500 square miles. In the remaining 15 basins, which contain approximately 15,000 square miles, the studies have been completed and the reports are being prepared.

In the New England Compact area, the Board has classified the waters of the Lake Champlain Basin and the Hoosic River Basin, and pollution abatement

programs are being conducted. The study of the Tenmile River, which is a tributary to the Housatonic River in Connecticut, has been completed and the report is in preparation. In cooperation with Vermont, the Board has completed its classification study of the Batten Kill, a Hudson River tributary, and the report is under way. Both States will hold public hearings on the proposed classifications for their respective portions of the drainage basin, with official classification in early 1962.

WAKEFIELD ELECTED CHAIRMAN SOUTHERN WATER RESOURCES CONFERENCE

At the 1961 annual business session of the Southern Water Resources Conference, John W. Wakefield, Director, Division of Water Resources and Conservation, Florida State Board of Conservation, was elected chairman for the next two years. Mr. Wakefield has served on the executive committee of the conference as vice-chairman. Marshall W. Qualls, Deputy Commissioner, Kentucky Department of Conservation was elected vice-chairman.

The conference was organized in 1957 as an informal gathering of officials of the 13 southeastern states. In 1959, the group adopted by-laws and elected the Honorable Sam Thompson, Chairman, Mississippi Board of Water Commissioners, as its first chairman. The Southern (Atlanta) Office of the Council of State Governments serves as a clearing house for conference activities.

AIR POLLUTION

NEW WASHINGTON AIR POLLUTION STUDY

Creation of a special air pollution sampling network covering Washington, D. C., and the nearby areas of Maryland and Virginia was announced recently by Secretary of Health, Education, and Welfare Abraham Ribicoff.

The network began operation September 26 under the joint sponsorship of the U. S. Public Health Service and the Washington Metropolitan Regional Conference.

Mr. Ribicoff, who recently warned the automobile industry to install "blowby devices" on new 1964 cars or face the prospect of compulsory legislation, said that the sampling network will measure total oxidant, a type of air pollution associated with smog formation. Oxidant is produced in the atmosphere by the photochemical action of sunlight on emissions from auto exhaust and other sources.

In addition to the U. S. Department of Agriculture Research Station in Beltsville, Maryland, six local governments are participating in the network. They are: the District of Columbia, the Counties of Fairfax and Arlington and the City of Alexandria in Virginia, as well as the Counties of Montgomery, and Prince Georges in Maryland.

"Studies conducted already," said Frank J. Lastner, Prince Georges' Commissioner and Chairman of the Health and Welfare Committee of the Washington Regional Conference, "make it clear that the entire Washington metropolitan area should prepare now to meet the air pollution problem which will inevitably accompany continued growth in population and motor vehicle traffic. Moreover, there is evidence to suggest that the problem is already with us. Air pollution here has produced complaints of eye irritation on several

occasions and the U. S. Department of Agriculture's station in Beltsville, Maryland, has reported ozone damage to tobacco plants."

NEW AIR POLLUTION STUDY AT WAYNE STATE

A large-scale animal study designed to study the possible effects of air pollution on human health will be undertaken at the Wayne State University College of Medicine in Detroit the U. S. Public Health announced recently.

Under a \$190,000 Public Health Service contract, researchers at Wayne State will study more than 4,000 experimental animals—rats, guinea pigs, rabbits, and mice—with particular emphasis on pulmonary function, length of life, blood studies, and pulmonary pathology. The animals will be divided into three groups, the first of which will breathe exhaust-contaminated air pulled in directly from a heavily traveled street through a large duct especially constructed for the study. The second group will be exposed to the normal urban air present in the laboratory. The third group will be housed in a room containing specially cleansed air, from which almost all impurities will have been removed.

Among the common air pollutants which will be measured continuously, using automatic electronic instruments, are carbon monoxide, total hydrocarbons, oxides of nitrogen, total oxidants, sulfur dioxide, carbon dioxide, and inorganic particulates.

Many of the animals will be kept under study during their entire lifetimes; others will be sacrificed to permit studies of tissue structure in lungs and other vital organs.

Additional studies will involve human subjects exposed to conditions comparable with those of the animals.

In the study Dr. Arthur J. Vorwald, Professor and Chairman of the Department of Industrial Medicine and Hygiene at Wayne State, will employ for the first time a technique which will permit measurement of the cardiopulmonary function of small laboratory animals. It is believed that these measurements will add important data to the study results. Dr. Vorwald said that the animals in the study will be subjected to a greater variety of physiological, biochemical, and histological observations than have been used in most tests of this kind.

PHS ESTABLISHES NEW AIR POLLUTION NETWORK

The establishment of a continuous air-monitoring program to provide vital information on air-pollution levels in American cities was announced recently by Surgeon General Luther L. Terry of the Public Health Service.

Designed to provide automatic measurement and analysis of the continuous fluctuating levels of pollutants in urban air, the program is based on special air-monitoring equipment located in the center-city area of eight major U. S. communities—Chicago, Cincinnati, Detroit, Los Angeles, New Orleans, Philadelphia, San Francisco, and Washington, D. C.

Built and equipped by the Public Health Service at a total cost of \$300,000, the new equipment will go into operation this fall and will provide, at the outset, automatic and continuous sampling and analysis of seven gaseous pollutants—sulfur dioxide, nitric oxide, nitrogen dioxide, carbon monoxide, ozone, total hydrocarbons, and total oxidants.

In addition to automatic gas sampler-analyzers, the stations will also house supplementary equipment to provide information on particulate pollutant concentrations, pollutants washed out of the atmosphere by rainfall, and measurements of wind turbulence at the sampling sites.

Continuous air monitoring is not intended to supplant the periodic sampling conducted by the National Air Sampling Network of the Public Health Service, which has been in operation since 1955. The National Air Sampling Network provides information, at more than 250 urban and rural sites, on average levels of particulate matter and of radiation; and, at 50 sites, on the average levels of two gases—sulfur dioxide and oxides of nitrogen.

The new continuous-monitoring stations will be operated by employees of the participating cities, all of whom have received special training at the Public Health Service's Robert A. Taft Sanitary Engineering Center in Cincinnati, Ohio. The first of the eight cities in which this operation will begin is Cincinnati, which will dedicate its station on October 23 to mark the beginning of Cleaner Air Week. The other stations are expected to begin operations within the month.

"While the National Air Sampling Network continues to be extremely valuable as a means of determining trends and changes in air pollution patterns nationally," said Vernon G. MacKenzie, Chief, Division of Air Pollution, Public Health Service, "we have for a long time needed more sharply defined information on the continuously changing levels of pollutants throughout the day and night for use in our research and epidemiological studies on the health effects of air pollution. The continuous air monitoring program should eventually fill this need."

NUCLEAR ENERGY

SPECIAL PROGRAM FOR RESEARCH GRANTS IN RADIOLOGICAL HEALTH

In view of the rapid expansion which is forecast in the use of nuclear energy, X-rays, and other sources of radiation, a greatly expanded program for research grants in the field of radiological health has been developed. These grants are offered to support research by individuals, universities, hospitals, laboratories, and other public or private institutions in the assessment and control of manmade and natural radiation exposures to the individual, no matter how the separate components may originate. The knowledge and skills of many professional disciplines and specialties - physicians, engineers, physicists, chemists, educators, statisticians among them - are needed to find answers to the many challenging questions in radiological health.

Research proposals should contribute to the determination of the extent and character of the radiation problem as well as the mechanisms by which radiation produces damage. Studies aimed at the elucidation of the radiation damage "cause and effect" relationship are essential if low-level and long-term radiation exposure effects are to be accurately assessed and general control programs organized. Therefore, basic studies relating to critical body organs and systems, preferred metabolic pathways for specific radioactive contaminants, and an understanding of the radiosensitizing and modifying effects of various materials are encouraged.

Broad epidemiological studies aimed at a scientific evaluation of the long term effects such as aging, congenital malformations, genetic effects,

behavioral patterns, and cancer induction are also of primary concern. Field studies of the movement of radioactive contaminants in biota and human food chains are of special interest, since we know the physical environment may be greatly altered by biological activity, as for example, the concentration of waterborne radionuclides in microorganisms and fish.

Purely physical studies, such as chemical mechanisms in radiation chemistry, the design of equipment and the development of techniques to accurately assess or reduce the population dosages are mandatory for a successful research program.

Studies aimed at directing scientific findings toward control devices or procedures are necessary in a "total view" of man's ecological system, as are studies that attempt to assess the relationship between health hazards created and possible benefits derived by radiation usage. The determination of the consequences of radiation exposure for present and future generations will require intensive investigation.

For information and/or application forms please contact: Dr. Paul F. Hahn, Chief, Office of Extramural Grants, Division of Radiological Health, U. S. Public Health Service, Washington 25, D. C.

John R. Thoman, EDITOR
1362 North Decatur Road
Atlanta 6, Georgia

ASSISTANT EDITORS

Walter A. Lyon
State Dept. of Health
Box 90
Harrisburg, Pennsylvania

CUMULATIVE INDEX TO ASCE PUBLICATIONS

A three-part index to Proceedings, Transactions, and CIVIL ENGINEERING is now available. This 816-page, 6 in. by 9 in., blue cloth bound book contains a subject and name index for CIVIL ENGINEERING that covers the magazine since its inception in 1930 through 1959. For Proceedings, the coverage is from 1950 through 1959, a period in which most papers were not included in Transactions. The 1935 through 1959 Transactions are indexed to provide a valuable source of reference to "modern" technical civil engineering literature.

The list price for this volume is \$20.00. Members of ASCE and public and school libraries are entitled to a 50% discount and will, therefore, pay \$10.00 per volume.

Order your copy of this INDEX by use of the coupon herewith.

-----CUT HERE-----

American Society of Civil Engineers
345 E. 47th Street, New York 17, N. Y.

Please send me _____ copy(s) of the ASCE CUMULATIVE INDEX. Enclosed herewith is my remittance for \$ _____. My ASCE membership grade is _____. List price, \$20.00; ASCE members and public and school libraries, \$10.00.

Print Name_____
Address_____
City_____
Zone_____
State

CUM IND

MANUAL ON GROUND WATER BASIN MANAGEMENT

The Committee on Ground Water of the Irrigation and Drainage Division has completed the newest in the series of ASCE Manuals on Engineering Practice. This Manual (No. 40) is concerned with the operation and management of ground water resources for irrigation and other beneficial uses. The Manual will find its field of greatest use in the planning of water development projects and in designing and programming facilities for the controlled conjunctive operation of surface and ground water reservoirs in order to make maximum use of available water supplies. Copies of the ASCE Manual No. 40 can be obtained by use of the attached coupon. The list price is \$4.00, with ASCE members and public and school libraries receiving a 50% discount.

-----CUT HERE-----

American Society of Civil Engineers
33 West 39th Street, New York 18, New York

Please send me. . . . copy(s) of Manual 40. Enclosed is my remittance of \$. . . . (List price \$4.00). My ASCE membership grade is

Print Name_____
Address_____
City_____
Zone_____
State

. . . M 40

ASCE MANUAL ON SEWAGE TREATMENT PLANT DESIGN

The result of several years of work by a joint committee of the Sanitary Engineering Division of ASCE and the Water Pollution Control Federation (formerly the Federation of Sewage and Industrial Wastes Associations) is available in a manual entitled "Sewage Treatment Plant Design." In this manual the joint committee has summarized and interpreted current practices in the design of sewage treatment plants. The committee does not attempt to approve or disapprove the practice, but merely reports what is being done.

Copies of ASCE Manual 36 can be obtained by use of the coupon herewith. The list price is \$7.00, with ASCE members and libraries receiving a 50% discount. Engineers who are members of WPCF but not of ASCE are urged to order their copies through the Federation so that the member discount of 50% will be available to them.

----- CUT HERE -----

American Society of Civil Engineers
345 East 47th Street, New York 17, New York

Please send me copy(s) of Manual 36. Enclosed is my remittance of \$ (List price \$7.00).

My ASCE membership grade is

Print Name

Address

City

Zone

State

. . . of M 36

SEWER DESIGN AND CONSTRUCTION MANUAL REPRINTED

ASCE Manual 37 "Design and Construction of Sanitary and Storm Sewers," issued in early 1960 as a joint effort with the Water Pollution Control Federation, has now been reprinted with corrections to several pages.

Those who have a copy of the 1960 edition can obtain, with the compliments of the Society, a reprint containing those pages that have been corrected for the 1961 printing. This reprint can be cut apart and the pages inserted into the previous edition.

The twelve-chapter manual contains 283 pages of text, 102 illustrations, 24 tables, and 119 references. As the first extended collection of information on the subject, it will make a valuable reference in an important phase of wastewater technology. Individual subjects covered include organization and administration of sewer projects, surveys and investigations, quantity of sanitary sewage and storm water, hydraulics of sewers, design of sewer systems, appurtenances and special structures, materials for sewer construction, structural requirements, construction plans and specifications, construction methods, and pumping stations.

THE EFFECT OF TEMPERATURE ON THE RATE OF REACTION

The effect of temperature on the rate of reaction was studied by measuring the rate of reaction between hydrogen peroxide and potassium iodide in the presence of a catalyst. The reaction is as follows:

$$2H_2O_2 \rightarrow 2H_2O + O_2$$

The rate of reaction was measured by the volume of oxygen gas evolved over a period of time. The temperature was varied from 10°C to 30°C. The results are shown in the following table:

Temperature (°C)	Rate of Reaction (ml O ₂ /min)
10	0.5
20	1.5
30	3.0

From the above table, it is evident that the rate of reaction increases with an increase in temperature. This is because the molecules have more kinetic energy at higher temperatures, and thus, they collide more frequently and with more energy, leading to a faster reaction rate.

The following graph shows the effect of temperature on the rate of reaction. The x-axis represents the temperature in degrees Celsius, and the y-axis represents the rate of reaction in ml O₂/min.

The graph clearly illustrates that the rate of reaction increases exponentially with temperature. This is consistent with the Arrhenius equation, which states that the rate constant of a reaction increases exponentially with temperature.

The following table shows the effect of temperature on the rate of reaction. The x-axis represents the temperature in degrees Celsius, and the y-axis represents the rate of reaction in ml O₂/min.

Temperature (°C)	Rate of Reaction (ml O ₂ /min)
10	0.5
20	1.5
30	3.0

From the above table, it is evident that the rate of reaction increases with an increase in temperature. This is because the molecules have more kinetic energy at higher temperatures, and thus, they collide more frequently and with more energy, leading to a faster reaction rate.

ASCE

Sanitary Engineering Division

1961-42--17

The manual may be ordered by use of the coupon herewith. The list price is \$7.00 per copy; ASCE members and public and school libraries can order copies at a price of \$3.50 each. The price to members of WPCF is the same, upon application to that organization.

-----CUT HERE-----

American Society of Civil Engineers
345 East 47th Street
New York 17, New York

Please send me copy(s) of Manual 37. Enclosed is my remittance of \$. . . . My ASCE membership grade is List price \$7.00. OR
Please send me a complimentary reprint of those pages from Manual 37 that were corrected for the 1961 edition. . .

Print Name

Address

City

Zone

State

